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Zero Retries is an independent newsletter promoting technological innovation that is occurring in Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Now in its third year of publication, with 1300+ subscribers.

About Zero Retries

Steve Stroh N8GNJ, Editor

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Web version of this issue - https://www.zeroretries.org/p/zero-retries-0141

Request To Send

Commentary by Editor Steve Stroh N8GNJ

Hamvention 2024, Ho!

Hamvention 2024 in Xenia, Ohio, USA countdown - ~~*19*~~ ~~*18*~~ ~~*17*~~ ~~*16*~~ ~~*15*~~ ~~*14*~~ ~~*13*~~ ~~*12*~~ *11 weeks!*

It's now looking possible that Tina KD7WSF and I may do another cross-country driving trip to attend Hamvention 2024. If we do so, there *will* be some "Zero Retries time" factored into this trip (unlike our 2022 cross country driving trip to Hamvention). If you're a Zero Retries reader that's "on the path" between Bellingham, Washington and Xenia, Ohio and would like to potentially meet up, let me know.

Paid Subscribers Update

Some weeks, like this one, are harder to write Zero Retries than others, but having four new Paid Subscribers to Zero Retries in one week was considerable "wind in the sails":

- My thanks to **Scott Nacey KK6IK** for becoming a Paid Subscriber to Zero Retries! KK6IK offered this nice message (now included in the Accolades for Zero Retries section of the **Zero Retries About** page) with his paid subscription: *[Zero Retries] is the best, most leading edge commentary on today's Ham Radio. Keep it up.*
- My thanks to **Charles Riley G4JQX** for becoming a Paid Subscriber to Zero Retries!
- My thanks to **Prefers to Remain Anonymous 22** for becoming a Paid Subscriber to Zero Retries!
- My thanks to **Prefers to Remain Anonymous 23** for becoming a Paid Subscriber to Zero Retries!

Financial support is a real vote of confidence for continuing to publish Zero Retries.

There were also fifteen or so new free subscriptions to Zero Retries this week. Thus *Thanks, someone,* for mentioning Zero Retries that motivated this burst of subscriptions.

Apologies for late publication of Zero Retries this week. This issue was "nearly done" as I came out to my office this morning, but as I started putting the final tweaks on this issue, the "background processes" in my mind took over and there was more detail to extract into text. Zero Retries is a passion project, where the content is more important than "deadline" (but not at the sacrifice of publication interval consistency).

Post-publication update: Upon publishing this issue, I noted a number of typos, omissions, and received a few good suggestions via the comments that merited a minor re-edit of this issue. Thus there are some minor differences between this "web version" and the version that was emailed to subscribers.

Bob Heil K9EID is a Muted Microphone

In the last few hours of preparation of this issue of Zero Retries, I learned that Bob Heil K9EID died today at the young age of 83. I'll let others such as ARRL tell the bigger story of K9EID's history and long string of accomplishments and honors.

To me, K9EID was one of those rare people that just seemed to radiate positive energy, and we in US Amateur Radio were blessed that he was one of us. I only met K9EID once at Hamvention a few years ago where we had a conversation about the merits of microphones that incorporated a native USB interface or using Heil's USB to analog microphone adapter (which I purchased). In those few minutes, I felt like I'd known him for years, and apparently that impression is universal within Amateur Radio.

K9EID was just a really nice person who made you feel like he was just a fellow Amateur Radio Operator, despite his vastly greater experience, knowledge, and expertise. K9EID didn't have to staff the Heil booth at Hamvention, but he obviously enjoyed doing so that he could talk to folks passing by and answer questions.

I'm not aware of K9EID being substantively involved in data communications in Amateur Radio[1], but he was *the authority* on voice audio quality on Amateur Radio units. "Dr. Bob" will be missed!

73,

Steve N8GNJ

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Some Semi-conclusions on Amateur Radio and the "Spectrum Workforce"

By Steve Stroh N8GNJ

Since Zero Retries 0140, with all that running around in my mind for a week now, I've developed some semi… "50%" (AKA half-assed) conclusions about Amateur Radio's role in improving the pipeline of individuals interested in radio technology and thus perhaps becoming motivated to join and grow the "Spectrum Workforce". My rumination was greatly helped by the great conversation and comments expressed in the Comments section of Zero Retries 0140 and some lengthy and multi-round email exchanges.

The primary conclusion I've come to about the issue of growing the "Spectrum Workforce" via Amateur Radio is that the *only* portion of the population that *could* have an interest in Amateur Radio in the 2020s and beyond… are *techies*[2]. In the end, Amateur Radio is a *technical* activity. Even the simplest activity of Amateur Radio - using a portable radio, requires enough interest to understand frequencies of operation, settings on the radio, knowing about the other party you're attempting to communicate with, procedure to get a response, etc. None of that "appeals" to *anyone* other than someone with a technical perspective, interest, and curiousity.

The other major justifications for Amateur Radio - "International Goodwill" and "Emergency Communications" were relevant in the previous century, but not now. Effortless and effectively free video conferencing and messaging, and multiple, robust systems now available to first responders have assumed those roles. I take no joy in those observations… that is simply the reality of Amateur Radio in the current century.

Thus… how does "Amateur Radio" (all of us current Amateur Radio Operators… organizations, etc. in toto) appeal to the techies of this era to the point of a techie becoming licensed as an Amateur Radio Operator and more importantly get involved in Amateur Radio… use Amateur Radio's vast capabilities, spectrum, etc.? At scale?

Obviously… Amateur Radio needs to market / advertise / recruit / evangelize Amateur Radio to techies. As I said in the Zero Retries 0140 comments, here in Zero Retries, I haven't been getting into the *specifics* of the outreach effort that would be needed to attract techies into Amateur Radio at scale. What platforms, who does the work, what the messaging should be, etc.? *Those* will be decisions for those that will actually *do the evangelism work... if* someone... someoneS, some organization steps up *to* do the work. I think it's going to require some new thinking and some new energy to coalesce into a modern, virtual, distributed, organization suitable for addressing the conditions of this century. Our existing Amateur Radio organizations just don't seem up to this particular challenge. That's not a slam on those organizations as they are of the previous century, when society and communications were vastly different.

Semi-conclusion 1 - *Fun* Stuff That Appeals to Kids

Some Amateur Radio activities can be fun, easy to access and understand, and can be really absorbing to kids. The techie kids can really dive deep, and the non-techie kids can still enjoy the activity. Activities like:

- **Transmitter ("Bunny" / "Rabbit") Hunts** can engage kids in, essentially, a more active form of hide and seek, with a minor reward, similar to Geocaching. They find the "bunny", they get a small prize.
- **Sitting on a park bench chatting on a portable radio with a friend** via a repeater is intriguing to a curious kid that the person they hear you chatting with is tens of miles away… and the kid's previous experience with FRS radios last summer at the amusement park was much more limited. There's an Amateur Radio group in Minneapolis / St. Paul Minnesota USA that goes way beyond that simple example - **Hams In The Park (HITP)** meets monthly during the Summer months in a regional park just for fun and camaraderie… and showing off Amateur Radio, at least a bit.
- **Parks On The Air (POTA) / Summits On The Air (SOTA)** is a bit more standalone than the park bench / HITP described above, but it can still be interesting exposure of Amateur Radio to a curious kid. I recall reading that my friend Dan Romanchik KB6NU provides a "one pager" as part of his POTA activities, which includes a brief explanation of Amateur Radio, and what specifically *he* is doing.
- **Balloon Launches** and the resulting tracking and recovery (especially with payloads the kids build) can really get kids involved. One interesting tip from Phil Karn KA9Q in his involvement with balloon launches is that if a kid gets their Amateur Radio license, *their* callsign gets to be on the balloon payload. To me, that's the perfect "hook" - no pressure - the balloon will still get launched, but if the kid is interested enough to get an Amateur Radio license, that "cool factor" of *their* callsign being on the payload is a quite a reward.
- **Ribbit / Rattlegram text messaging** with ordinary consumer radios (like FRS / GMRS). Wait… *what*??? You could text without a cellular connection??? I didn't know you could *do* that!
- Use a **standalone WSPR transmitter in a classroom**[3]. The kids will come in each morning and fire up one of the classroom computers to see what new countries *their signals* were heard in over the previous day.
- **Public display of decoding data signals on HF**, such as in a museum. I thought of this idea from grant requests from museums with an Amateur Radio display during my time on the ARDC Grants Advisory Committee. Imagine a display with a waterfall or other visual representation of signals, and a knob that lets an observer change the receive frequency to match a signal displayed on the screen. There would also be a speaker with the received signal being heard (but not too loud). Then, as the signal is tuned in, a second display displays the decoded signal. Of all the data signals I've heard, RTTY is the coolest-sounding (to me).
- **Set up a Raspberry Pi as an FM broadcast transmitter**. This would work best as an additional element of a curriculum that otherwise uses Raspberry Pis as instructional elements. The "wow factor" of this demonstration would be that Raspberry Pi's are "just computers", or "robot controllers", right? First, have an FM broadcast receiver and tune a few local broadcast stations. Explain that *those* transmitter systems are *very* big, *very* expensive, *very* complicated (show a photo). Then, load a (pre-loaded) Micro SD card into a Raspberry Pi, attach the appropriate wire length to the appropriate pin, and plug in a USB handheld microphone (check your local thrift store - I've purchased several that way). What kid wouldn't want to be their own announcer on the radio? Then send kids out the door with the receiver and see how far the signal propagates.
- **Operate via the "easy sats"**[4] (Amateur Radio satellite repeaters) in a public setting. A big, interesting looking antenna (but not too big as it's typically held in hand) and a portable radio… there are multiple layers of this activity to a curious kid. A laptop computer displaying the satellite's profile could be an effective display.
- **Participate in Neil's Night**[5] (attempt receiving data of Earth-Moon-Earth contacts on the evening of July 20th, the anniversary of humanity's first steps on the Moon). See the Neil's Night series in Zero Retries 0097, Zero Retries 0098, and Zero Retries 0099 for more details.

- **Provide assistance in participating in Amateur Radio STEM curriculums**[6] SPARKI, developed by ARISS (Amateur Radio on the International Space Station) is an excellent example of well-developed STEM curriculum that incorporates Amateur Radio. Despite the development work done by ARISS, there's always room for assistance of a teacher, especially if the assistant is knowledgeable about the subject (radio, physics) and has some relationship with the school such as being a parent or grandparent of a student.

Note that all of these activities *seem casual* - to the kid. In reality, they require planning and preparation. But the kids can walk up, take it in, ask questions, and depending on their interest (or, the skill of the preparation and the presenter) they *might* want to get more involved.

That willingness to let the kid engage at *their* interest level - lightly, deeply, or not at all, is *critical*. Too often, we adults *do* take this seriously (because, you know, we put a lot of work into this "on your behalf"), thus the danger of taking it *too* seriously.

Taking such demonstrations of radio technology *too* seriously is one minor criticism I have with some of the STEM projects that promote Amateur Radio. In my opinion, some of them lean too hard on the theory and follow-on like "ready to study and get your Amateur Radio license?" Some, probably most kids were just curious about the funny looking piece of electronics.

Semi-conclusion 2 - Us Amateur Radio Techies Have to Rise Above the "Same Old, Same Old"

Given the "environment" of typical Amateur Radio that emphasizes activities like HF, contesting, DXing, etc. (as exemplified by the Same Old, Same Old content that comprises most of QST magazine and the late CQ magazine), we techies who are in Amateur Radio for the *technical fun and experimentation* (like what I described with SD Transceivers in **Zero Retries 0140**) are going to have to find ways to rise above the "Same Old, Same Old" factor if Amateur Radio is going to be able to appeal to techies.

One example I've learned the hard way in my Amateur Radio experience is that it's not enough for *me* to build up *my* cool new system to try out a cool new mode… and then try to talk it up to promote others to build a similar system so *they* can also play with the cool new mode. If you want to get the point across about a cool new mode such as:

- VARA FM
- **Packet Radio** at 2400 bps DPSK or 2400 / 4800 / 9600 bps FSK using Improved Layer 2 Protocol (IL2P) Forward Error Correction (FEC)
- The potential for a "universal radio" using a Software Defined Transceiver
- New Packet Radio
- Icom D-Star Digital Data mode (128 kbps)
- Amateur Digital Television

(These are all examples of things I plan to work on, some of which I have purchased equipment for.)

To showcase a new mode / system, the reality is that you'll need to build at least three units, and I've embraced that reality. When I purchase "bits and bobs" to start a new project to explore a new mode, I willingly endure the extra cost of buying more than one unit so that I can put a second, or third station together *so that I can provide a loaner unit to someone that expresses interest*. Getting someone to invest *their* funds on something that (to them) is *speculative*, that they might not end up enjoying, is a big ask. But borrowing a loaner unit, taking it home and plugging it in and trying it out is a lot more approachable. If they like it and decide that they want to play along, you're in a good position to act as an advisor / coach / troubleshooter for their involvement.

For example, there's currently no VARA FM activity (that I'm aware of) in my county. Thus I'm in the process of building up two, and eventually three VARA FM units using 222 MHz radios that will showcase the speed of VARA FM for in-person demonstrations, such as upcoming meetings of the local Digital Group. That wasn't cheap - two radios, two modems, two (used, surplus) laptops, etc. But it's the ~~only~~ *most effective* way (I know of) to explain the value of VARA FM - let people see it for themselves and potentially make loaner units available.

Another example is that there are no repeaters in my area where data transmissions are welcome. Some experiments with data over repeaters have been *tolerated*, with *prior arrangement*, for *brief* periods… but not *welcome*. Thus I'm working towards creating a new repeater[7] that will be a conventional FM repeater which will welcome data communications as a primary use - no apologies, disclaimers, scheduling required.

Semi-conclusion 3 - Guerrilla Evangelism Force for *Technical* Amateur Radio

In the absence of a grand campaign and an organization that's funded and chartered to do a grand campaign to promote modern Amateur Radio for this era, we Amateur Radio techies are, by necessity, need to become a "guerrilla evangelism force".

We who choose to become "Guerrilla Evangelists" for *Technical* Amateur Radio will, again by necessity, need to start thousands of individual, small, laser-focused campaigns. The task is to chat up individual school instructors about the value of Amateur Radio to classes and students that would benefit from participating in Amateur Radio. This can start as simply as an individual Amateur Radio

Operator who's playing around with something interesting coming in to a class as a "guest presenter".

Another approach is to "put yourself out there" to present Amateur Radio in some (non Amateur Radio) technical activity or conference. An example is that I volunteered to do a talk at LinuxFest Northwest here in Bellingham, Washington, USA. My talk will be **Amateur Radio and Open Source** and I will highlight that Amateur Radio, despite the popular ("Same Old, Same Old") perception, is actually a "hacking" culture not dissimilar to the Linux culture, and that there is a lot of Open Source software (and hardware) in use in Amateur Radio *in this era*. I want to put *Technical* Amateur Radio out in front of them, including a handout with some resources such as online study, online exam sessions, and most importantly *my name and contact info* as a personal resource for them if they want to learn more.

A similar approach *may* work with Amateur Radio conferences and events such as a demonstration at a hamfest, but the "Same Old, Same Old" resistance will be considerable. The upside of Amateur Radio conferences and events is that in *that* crowd, an Amateur Radio license can (usually) be assumed. Thus if the folks at the hamfest are interested, they can get started a lot faster.

These "be brave and put yourself out there" approaches *are* necessary. An example is that my experiences with trying to evangelize Technical Amateur Radio activities at existing Amateur Radio clubs, even here in the high-tech Pacific Northwest, have been discouraging… while my presentations have been politely received, there is little "uptake" within the club[8]. Even Amateur Radio clubs that have a founding in technology companies seem to be far more interested in "Same Old, Same Old" Amateur Radio.

Thus, I'm imagining small "guerrilla bands" of 2-5 people (you're going to need at least one co-conspirator) doing this evangelism, willing to be on speed dial for supporting classes, explaining weird stuff about Amateur Radio to the instructors, hand-holding for the instructors to get their license (if desired, etc.) It can go as far as perhaps establishing an Amateur Radio club a school or organization, complete with helping them write a grant proposal to ARDC to get it started with some equipment instead of "whatever you can get donated" which won't be a great experience.

Concluding My Semi-conclusions

These are just some of *my ideas*… my "it seems to me's" about growing Amateur Radio by reaching out to those fellow "technically curious" individuals in our now-technical society. I'm convinced that such an approach would work (and has proven to work, albeit on a small scale). But as to the bigger picture of doing so at scale, well, that will have to be up to those (few) that have the ability to make such a project a reality.

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At Peace with Amateur Radio Over Internet

By Steve Stroh N8GNJ

*My misgivings about Amateur Radio Over Internet is that I probably know too much from my background writing about the Internet industry and my knowledge of just how fragile consumer Internet access is, especially via cable, DSL, and cellular. "Consumer Internet" fails when there is **any**, even minor "disruption". My daughter offered me an recent example of a car crash into a power pole near her apartment building took out not only her cable Internet, but also cellular service because apparently there was a heavily used fiber bundle on that pole. When that fiber bundle was severed it disabled the cellular microcell that provided cellular service in her apartment building.*

"Kind of the point" of Amateur Radio, at least in my mind, is that it can work independent of external systems such as grid power and consumer Internet access, and putting Internet in the middle of an Amateur Radio activity or system can compromise the utility of Amateur Radio.

The TL;DR of this article is that I'm at peace with Amateur Radio Over Internet. This conclusion, this change of perspective, has been in gestation with me for quite some time, easily more than a decade, or two.

This article was originally my Semi-conclusion 4 (see previous article), because Internet is so integral to the current generation that any communications technology that doesn't incorporate Internet to some degree might be perceived as irrelevant or just… dumb. Thus I wanted to address that, but as I worked on this article, it made more sense for this subject to be a seperate article.

My perspective to *fully* embrace Amateur Radio Over Internet[9] resulted from a number of factors:

- There are many, *many*, ***many*** *good*… ***great*** uses of Internet in combination with Amateur Radio such as WSPRnet, BrandMeister, Winlink, aprs.fi, "incidental Internet Access" via HamWAN, etc. that provide a synergy between the utility of Amateur Radio and the utility of Internet, resulting in a unique capability that wouldn't be possible solely with Internet or solely with Amateur Radio.

- I'm a proponent of the Internet Tunnel function of AREDN nodes. That capability lets an individual connect with other AREDN nodes and users and get familiar with using AREDN without requiring another station to be within range (which is problematic with low power microwave units). If you get comfortable about AREDN, it's then easy (and fun) to encourage someone else within range to set up an AREDN node so you can share the fun.

- My *colleague-in-writing-about-Amateur-Radio*, Tom Salzer KJ7T (who writes The Random Wire newsletter) made a compelling case that Amateur Radio Over Internet… *is still Amateur Radio*. He made the case so well that after reading KJ7T's article Easy AllStarLink, I felt that my misgivings about Amateur Radio Over Internet was akin to one of those "That's not real Amateur Radio" elitist snobs that I have no use for. (Thanks KJ7T for curing me of my misgivings about Amateur Radio Over Internet).

- With any luck, my local Amateur Radio club will soon set up a remote HF station that can be a nice perk / incentive for club members who can't have an HF station of their own to try out HF via web browser. I hope that we'll be able to implement something like Remote Ham Radio's "Youth Network" that offers free use of remote HF stations for Amateur Radio Operators up to 21 years old.

- ARDC seems poised to offer their 44Net Virtual Private Network (VPN) in 2024. I think this will be a gamechanger for use of Internet within Amateur Radio. With the 44Net VPN, Amateur Radio Operators can use a static, routable IPv4 addresses for their activities. One cool aspect of getting a 44Net IPv4 address is that you aren't issued a single IPv4 address, at minimum, you're issued a small block. Thus you can have more than one system online. One fun thing I can easily imagine is assigning an individual IPv4 address to a VOIP telephone. With the right phone and setup, no "PBX" (such as Asterisk) is needed - just put your buddy's 44Net IP address for his VOIP phone into your VOIP phone's speed dial. I'll be writing more extensively about the 44Net VPN and its implications in a future article in Zero Retries.

- I hope to provide remote access to various Amateur Radio systems for software and other development as part of N8GNJ Labs, which will be implemented via Internet and 44Net.

But one of the biggest factors of my now being *At Peace with Amateur Radio Over Internet* is the arrival of Starlink as an option for *consumer* Internet access *that can be highly reliable*. Indeed, Starlink is battle-tested by use in Ukraine, and Starlink is not easy to disrupt by weather events, power failures, pole-seeking vehicles, fiber-seeking earthmovers, etc.

Starlink is a bit more expensive than typical consumer Internet access, and not quite as fast, especially not as fast as fiber Internet. Starlink is also not symmetric - upload speeds are considerably lower than downlink speeds… but given the physics of satellite communications bandwidth, that's a limitation that's easy to understand.

If I can keep my Starlink terminal powered (totally feasible now as I demonstrated on a small scale with my "Meadow Day" experiment last summer), then I have *highly reliable* Internet access, including IPv6. For example, I would never consider becoming a local Winlink Radio Mail Server (RMS) if my only Internet access was via a cable modem. Even keeping my cable modem powered on emergency power wouldn't provide a reasonably reliable Internet connection. But with *Starlink*, maintaining reliable Internet access for Winlink users (and my neighbors) during a power outage or other communications emergency is entirely feasible.

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ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

Continued Progress on Remote Radio Unit

Wojciech Kaczmarski SP5WWP is designing the Remote Radio Unit and recently posted an update on LinkedIn:

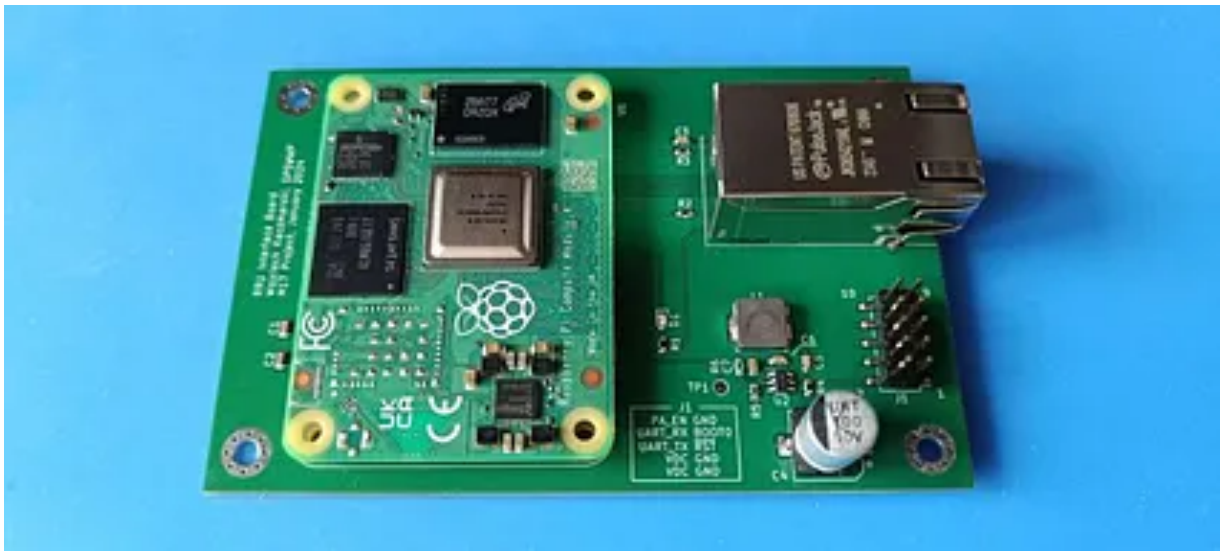

Image courtesy of Wojciech Kaczmarski SP5WWP

Ethernet interface board for the Remote Radio Unit (RRU). It connects to an Eth-fiber converter and allows for baseband transfer using "CPRI-lite" protocol based on ZeroMQ. Standby for more news concerning our open source M17 RAN hardware (and more!).

Schematics, PCB - GitHub:
https://lnkd.in/dMWrJ22w

Made possible with a lot of help from:
Amateur Radio Digital Communications (ARDC)
Deutscher Amateur-Radio-Club e.V.

The Remote Radio Unit is a very Zero Retries Interesting Project - see **Zero Retries 0130** - Remote Radio Unit for M17 / FM Repeaters. The name is unassuming… practically a *stealth* name designed to "undersell" the concept of the project, which is to develop a compact Amateur Radio 70 cm (420-450 MHz) *repeater*, complete with integral duplexer that could be installed close to an antenna. With the radio systems in close proximity to antenna, only power and communications (fiber Ethernet) are required to be run up a tower (no coaxial cable or hardline).

As with all projects funded by ARDC, this project is open source. It's fascinating to consider the implications of this unit. SP5WWP seems to be making progress rapidly enough that prototypes of this unit might be shown (*my speculation*) at major Amateur Radio events - certainly at HAM RADIO this Summer.

Qualcomm's Newest Chip Brings AI to Wi-Fi

The FastConnect 7900 relies on AI to improve connectivity while reducing power.

Wireless spectrum is always at a premium—if you've ever tried to connect to Wi-Fi in a crowded airport or stadium, you know the pain that comes from crowded spectrum use. That's why the industry continues to tinker with ways to get the most out of available spectrum. The latest example: Qualcomm's FastConnect 7900 chip, which the company unveiled Monday at Mobile World Congress in Barcelona.

Qualcomm touts the FastConnect 7900 as a provider of "AI-enhanced" Wi-Fi 7, which the company views as an opportunity to create more reliable wireless connections. The chip will also better integrate the disparate technologies of Wi-Fi, Bluetooth, and ultrawideband for consumer applications. In addition, the chip can support two connections to the same device over the same spectrum band.

…

Using AI to manage wireless spectrum connections isn't a new problem or solution, but Qualcomm's chip benefits from running everything on-device. "It has to run on the device to be effective," says del Prado. "We need to make decisions at the microsecond level."

Put another way, using the Wi-Fi connection itself to transmit the information about how to adjust the Wi-Fi connection would defeat the purpose of AI management in the first place—by the time the chip receives the information, it'd be way out of date.

Unlike every other mention of putting Artificial Intelligence (AI) features gratuitously into a product just to generate “buzz”, this inclusion of AI features (arguably mostly algorithmic… but perhaps it can “learn”, thus justifying the AI label) makes sense. It makes even more sense when you factor in dynamic interleaving of different radio technologies such as Wi-Fi, Bluetooth, Near Field Communications (NFC), and even Ultrawideband (UWB) and various spectrum such as 2.4 GHz, 5 / 6 GHz, and 60 GHz.

I really like that these features are “on chip”, and hopefully we’ll soon see such functionality migrate into chipsets that are more flexible with regards to choice of spectrum. I can imagine many scenarios in Amateur Radio for such a device.

DietPi Version 9.1

Image courtesy of dietpi.com

> DietPi is an extremely lightweight Debian OS, highly optimised for minimal CPU and RAM resource usage, ensuring your SBC always runs at its maximum potential.
>
> …
>
> The February 19th, 2024 release of DietPi v9.1 comes with new support for the Raspberry Pi 5, enhancements for ROCK 4 SE and NanoPi R5S/R5C/R6S/R6C/T6. Additionally, enhancements and bug fixes for several dietpi-software options are included.

I was unaware of “DietPi” until this mention of v9.1 surfaced recently. This makes complete sense as Rasperry Pi is increasingly targeting its new systems, and Raspberry Pi OS as a desktop-class computer and operating system. DietPi seems like a better fit for “appliance” applications such as Amateur Radio… perhaps even a good choice as an OS for the DigiPi system.

It’s also interesting that despite the “Pi” in the name, DietPi is developed for a *range* of single board computers, including some pretty popular units such as PINE64, Orange Pi, and even RISC-V which I expect to see a lot more usage in the coming years.

Replacement PCB Replicates Early 80s Modem

> The new [WiFi Retromodem] PCB is equipped with everything needed to get a retro computer online again, including all the ports to connect a computer without any further modifications. It houses a few modern upgrades beyond its on-board processors, though. Rather than needing an actual acoustic coupled phone, this one has an ESP32 which gives it wireless capability. But the replacement PCB maintains the look and feel of the original hardware by replicating the red status LEDs at the front, fitting into the original Hayes cases with no modifications needed at all, and even includes a small speaker through which it can replicate the various tones, handshakes, and other audio cues that those of us nostalgic for this new online era remember quite well.

This is exactly what I imagine doing in a (distant) future project in re-animating a number of Amateur Radio data communications units, most notably a quantity of PK-232s that I have accumulated. My imaginary name for this project is **Franken-232**. I imagine retrofitting the PK-232s with a high-resolution audio interface and a Raspberry Pi computer. But, there are *many* projects queued up here in N8GNJ Labs ahead of the Franken-232… but I’m looking forward to working on it *eventually*. If anyone wants to jump ahead of me on such a project, get in touch - I’m sure we can work something out.

Inspired by this unit, my Franken-232 project will now include a speaker and an audio clip of a 1200 bps AX.25 connection handshake. If the Franken-232 ever does become reality, I'll immortalize my callsign as part of that audio clip.

Leave a comment

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Feedback Loop

There was a lot of *great* commenting, conversations, and cross-fertilization… and even some co-conspiratorial discussion in the **Comments of Zero Retries 0140**. Thank you commenters (and email correspondents) - that level of interest helps keep me going!

If you provide feedback via email, I may excerpt your feedback or include it in full. Unless you specifically grant me permission to include your name, I won't do so. Feedback may be lightly edited for clarity.

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out
Join the Fun on Amateur Radio for some pointers.

Zero Retries Frequently Asked Questions (FAQs) — In development 2023-02.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with radio technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to everyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing ***Thanks*** to:

- Tina Stroh KD7WSF for, well, *everything!*
- ***Founding Members*** **who generously support Zero Retries financially:**
  Founding Member 0000 - Steven Davidson K3FZT
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- Numerous Annual and Monthly subscribers who also generously support Zero Retries financially!

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- The *most* effective way to support Zero Retries is to simply mention Zero Retries to your co-conspirators that are also interested in knowing more about technological innovation that is occurring in Amateur Radio and encourage them to become a fellow subscriber.
- One particularly effective method of promoting Zero Retries is to add a mention of Zero Retries to your QRZ page (or other web presence) and include a link:

  https://www.zeroretries.org
- If you'd like to financially support Zero Retries, becoming a paid subscriber is *greatly* appreciated and helps offset expenses incurred in publishing Zero Retries. Paid subscriptions for Zero Retries are *entirely optional*, as explained in this special issue of ZR:
  Zero Retries Administrivia - Activating Payment Options.

These blogs and newsletters regularly feature Zero Retries Interesting content:

- Dan Romanchik KB6NU mentions “Zero Retries Interesting” topics so regularly on his blog (that I otherwise wouldn’t know about) that I’ve bestowed on him the honorific of Pseudostaffer.
- Jeff Davis KE9V also mentions “Zero Retries Interesting” topics so regularly on his blog (that I otherwise wouldn’t know about) that I’ve bestowed on him the honorific of Pseudostaffer.
- Amateur Radio Weekly by Cale Mooth K4HCK is a weekly anthology of links to interesting Amateur Radio stories.
- Experimental Radio News by Bennet Z. Kobb AK4AV discusses (in detail) Experimental (Part 5) licenses issued by the US FCC. It’s a *must-read-now* for me!
- RTL-SDR Blog - *Excellent* coverage of Software Defined Radio units.
- TAPR Packet Status Register has been published continuously since 1982.
- Other Substack Amateur Radio newsletters recommended by Zero Retries.

These YouTube channels regularly feature Zero Retries Interesting content:

- HB9BLA Wireless by Andreas Spiess HB9BLA
- KM6LYW Radio by Craig Lamparter KM6LYW (home of the DigiPi project)
- Modern Ham by Billy Penley KN4MKB
- Tech Minds by Matthew Miller M0DQW

Zero Retries is currently using the Substack email publishing platform to publish Zero Retries. It’s particularly suitable for small newsletters as you can get started for no cost.

If you’re reading this issue on the web and you’d like to see Zero Retries in your email Inbox every Friday afternoon, just click below to join ***1300+*** other subscribers:

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Offering **feedback or comments** for Zero Retries is equally easy — just click:

Leave a comment

If you’re a fellow smart person that uses **RSS**, there *is* an **RSS feed for Zero Retries**.

Social Media:

Zero Retries (N8GNJ) is on Mastodon — n8gnj@mastodon.radio — just click:

Zero Retries / N8GNJ on Mastodon

Zero Retries (N8GNJ) is also on Bluesky — @n8gnj — just click:

Zero Retries / N8GNJ on Bluesky

Email issues of Zero Retries are “instrumented” by Substack to gather basic statistics about opens, clicking links, etc.

More bits from Steve Stroh N8GNJ:

- SuperPacket blog — *Discussing new generations of Amateur Radio Data Communications — beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog — *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs — Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham (The City of Subdued Excitement), Washington, USA, and linked to the Internet via **Starlink *Satellite* Internet Access**.

2024-03-01

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1

Thus my use of "Muted Microphone" honorific for those, like Art Bell W6OBB before him, who were far more active using voice modes on Amateur Radio than CW (Silent Key) or data communications (Silent Keyboard).

2

… growing Amateur Radio at *scale*. Of course there will continue to be folks that become Amateur Radio Operators for reasons other than being a techie, such as family and friends who are inspired, and the desire for personal "off the grid" communications, etc.

3

"Standalone" as opposed to a unit like a typical HF transceiver connected to a WSPR modem. Of course, this would require an Amateur Radio Operator to act as a "control operator" / sponsor - could be a fellow instructor, parent, grandparent, etc.

4

This item was added post-publication per suggestion from Zero Retries Founding Member Ben Kuhn KU0HN. See https://www.zeroretries.org/p/zero-retries-0141/comments.

5

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6

This item was added post-publication after seeing a mention of the great work being done by ARISS with the SPARKI project.

7

Yes, the reality / necessity of *creating a new repeater grates on me also* given the lack of use of most Amateur Radio repeaters in this era. But, repeater owners are herd creatures and very, very few would welcome regular use of data over *their* repeater. Thus creating a new repeater is just one part of "routing around the Same Old, Same Old" attitudes in Amateur Radio.

8

One reasonable explanation I heard for what I've observed is one Amateur Radio Operator's explanation: "In my day job, I work on very intense high tech systems. Thus in my non-work time, I don't want to do more "high tech" - I get enough of that at *work*. Instead, I like the "low-tech" stuff - random CW contacts, low power radios, and experimenting with different kinds of HF antennas." That makes sense.

9

I make a distinction, that often doesn't translate well in text without lengthy explanations (like this footnote) between Internet, and *intranet*. The former is "the big worldwide network". The latter is the use of Internet *technologies* such as the TCP/IP protocol, routers, Wi-Fi access points, Ethernet, etc. The latter was never problematic to me at all, no more than using RS-232 data cabling with my Amateur Radio equipment.